STATISTICS IS...

THE ART & SCIENCE OF DEALING WITH DATA

SECTION 1.1: Where do data come from?

Individual = The objects described by a set of data. People, animals, cars, things, etc.

Variable = Any characteristic of an individual. Anything you can measure about an individual. Ex: Height, weight, color, MPG, etc.

Variables can take different values for different individuals.
zip code, area

CATEGORICAL	QUANTITATIVE
* places an individual into one of several groups/ categories	* takes numerical values
	* makes sense to take an average
*EX: hair color, race, breed	* EX: height, weight, grade
grade (B, B-)	(77.)

EX: Colleges/Universities

Categorical
tuition $ $$ $$$
rank of ed. (good, fair, poor)
Division sports
What sports
location
size (S, M, L, XL)
extra curric.
majors food

Quantitative (units)
% greek life
stud./teacher ratio
tuition ($)
scholarship $
sports
GPA, SAT, ACT
miles from home
size (# students)
majors
dining halls

Complete the next example on your own

Individuals: People living in NYC in 2000 in Greenwich Vill.

Variables:

Sex C	EduCode Q
Age Q	EduText C
Race C	Income Q
Hispanic C	Industry C
Ancestry C	Job C
Marital C	

Population = ALL individuals about which we want to gather information.
All CBS students

EX: ALL US colleges/universities, ALL people in Bucks County, ALL students in CB South, ALL CBS seniors

Sample = part of a population from which we actually collect data. We then use this data to draw conclusions about the population.

Good samples: RANDOM & REPRESENTATIVE

Ex: TV show ratings
Population: ALL people in US who watch TV
Sample: The households who agree to have a recording device installed in their home to monitor what they watch

Complete the next 3 examples on your own

Example 1:

(a) Population = All Philadelphians

(b) sample = patrons at her favorite restaurant at lunch time that answer her on one day

(c) variables = Smoking ban (favor/oppose) Categorical

(d) representative? accurate?

Probably not. It is one restaurant, on one day, not random, .

Example 2:

(a) Popuation = All Delaware River water

(b) sample = the 8 samples he takes on his trip

(c) variables =

amount of pollutants	Quantitative
Oxygen level	Quantitative
Location taken	Categorical
Time taken	Categorical

(d) representative? accurate?

Most likely. No real bias

Example 3:

(a) population = All americans

(b) sample = the people who go to the ESPN website and vote

(c) variables =

who will win the super bowl Categorical

(d) representative? accurate?

Probably not. They are only sampling those people who watch ESPN and go to the website and vote. This will not represent all Americans opinions.

Observational Study = Observes individuals and measures variables, but does not try to influence the responses. Does not change the individuals at all.

Ex: Survey

* Sample Survey = Observational study that uses a sample

Experiment = Deliberately imposes a treatment on the individuals in order to observe the response. Purpose: to see if the treatment causes a change in the response

Open books-

Complete p. 14 #13, 14, 18

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13) Experiment. The treatments are the new and old muffins that the people are asked to eat.

14) (a) Observational Study. There is no treatment. They did not make people use cell phones or have brain cancer.

(b) Individuals = the people with brain cancer & the people matched with them

Variables = Cancer, cell phone use

18) (a) experiment. They gave each person the two treatments

(b) helps determine a change in whitening on each person. Not everyone starts from the same whitening level.

Using your books and answer the questions about a CENSUS

Census = An observational study that attempts to contact the entire population, instead of using a sample.

Advantages: - all data

Disadvantages: - time
- $
- difficult

US Census
- mail homeless